

Volcanic Control of Jupiter's Aurora and Middle Magnetosphere Dynamics Observed by Hisaki/EXCEED

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Temporal variation of Jupiter's northern aurora during enhanced Io volcanic activity was detected using the EXCEED spectrometer on board the Hisaki Earth-orbiting planetary space telescope. It was found that in association with reported Io volcanic events in early 2015, auroral power and estimated field-aligned currents were enhanced during day of year 40–120. Furthermore, the far ultraviolet color ratio decreased during the event, indicating a decrease of auroral electron mean energy and total acceleration by <30%. During the episode of enhanced Io volcanic activity, Jupiter's magnetosphere contains more source current via increased suprathermal plasma density by up to 42%; therefore, it would have required correspondingly less electron acceleration to maintain the enhanced field-aligned current and corotation enforcement current. Sporadic large enhancements in auroral emission detected more frequently during the active period could have been contributed by non-adiabatic magnetospheric energization.

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